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A REPORTER AT LARGE

## THE FIERCE ANTHROPOLOGIST

*Did Napoleon Chagnon's expeditions harm one of the world's most vulnerable tribes?*

BY PATRICK TIERNEY

In November, 1964, Napoleon A. Chagnon, a twenty-six-year-old American anthropology graduate student, arrived in a small jungle village in Venezuela, to study one of the most remote tribes on earth--the Yanomami Indians. At the time, the boundaries between Venezuela and Brazil were still uncertain. The upper Orinoco, with its tumultuous rapids and impassable waterfalls, had frustrated conquistadores since the sixteenth century, making its mountain redoubts a perfect blank slate for the dream of El Dorado and other fantasies about the New World. The German naturalist Alexander von Humboldt, who visited the area at the turn of the nineteenth century, wrote, "Above the Great Cataracts of the Orinoco a mythical land begins . . . the soil of fable and fairy vision." The Yanomami themselves were rumored, by other tribes and by the earliest explorers, to be "wild" and dangerous--so dangerous that, in 1920, one of the first Americans to encounter them, the geographer Hamilton Rice, opened fire with a machine gun, fearing that the Yanomami were cannibals. Four years later, Rice met the Yanomami again and wrote that they "are not the fierce and intractable people that legends ascribe them to be, but for the most part poor, under-sized, inoffensive creatures who eke out a miserable existence."

The reality that Chagnon encountered was, in many ways, stranger than anything previously imagined. In "Yanomamö: The Fierce People," which was published in 1968, Chagnon gave both a harrowing account of a prehistoric tribe and a sobering assessment of what life was like for people whom he later referred to as "our contemporary ancestors." "The Fierce People" eventually became one of the most widely read ethnographical books of all time, selling almost a million copies in the United States alone. Buttressed by subsequent films about the Yanomami made by Chagnon and a documentary filmmaker, Timothy Asch, the book became a standard text in anthropology classes worldwide, and it has gone through five revised editions, the last one in 1997.

"The Fierce People" was written with the verve of an adventure story but was grounded in extensive empirical research. The book opens with this description of Chagnon and an American missionary named James Barker, stumbling into a Yanomami village:

I . . . gasped when I saw a dozen burly, naked, sweaty, hideous men staring at us down the shafts of their drawn arrows! Immense wads of green tobacco were stuck between their lower teeth and lips making them look even more hideous, and strands of dark-green slime dripped or hung from their nostrils. We arrived at the village while the men were blowing a hallucinogenic drug up their noses. . . . I just stood there holding my notebook, helpless and pathetic. . . . What sort of a welcome was this for the person who came here to live with you and learn your way of life, to become friends with you?

By 1968, Chagnon had spent nineteen months with the Yanomami. During this time, as he writes, he "acquired some proficiency in their language and, up to a point, submerged myself in their culture and their way of life." He studied the Yanomami in a broad variety of aspects, from their travel habits to their technology, use of hallucinogens, agriculture, intellectual life, social and political structures, patterns of settlement, division of labor, marriage practices, trading, and feasting. What was most striking about them was, he wrote, "the importance of aggression in their culture." The Yanomami, he concluded, lived in a "state of chronic warfare":

I had the opportunity to witness a good many incidents that expressed individual vindictiveness on the one hand and collective bellicosity on the other. These ranged in seriousness from the ordinary incidents of wife beating and chest pounding to dueling and organized raiding by parties that set out with the intention of ambushing and killing men from enemy villages.

Between 1968 and 1972, Chagnon made five more expeditions into Yanomami country, exploring increasingly remote villages. In a 1974 book, "Studying the Yanomamö," and in subsequent editions of his first book, he describes surviving a murder attempt by his hosts--whom he frightens off with a flashlight--and a close encounter with a jaguar, which sniffs him in his hammock. Despite repeated death threats, he pushes on into uncharted territory, where he discovers an isolated group, whose members he calls "the Fiercer People." Abandoned by a Yanomami guide, he hollows out a log canoe and returns downriver.

Since the turn of the twentieth century, anthropologists had been inspired to venture farther and farther afield in search of "pure" people, uncontaminated by the Industrial Revolution. In the nineteen-twenties, Margaret Mead went to the South Pacific and wrote her best-seller "Coming of Age in Samoa." Mead described native life in idyllic terms that spoke to the war-weary mood of the time, while overlooking some of the less pleasant aspects of Samoan life, such as the high incidence of violent rape.

"The Fierce People" was the product of a different period. Chagnon, who was born in 1938, had spent an austere childhood in small-town, rural Michigan; his father was an undertaker, and he was the second of twelve children. He earned his doctorate in anthropology at the University of Michigan, and obtained a grant from the National Institute of Mental Health to study the Yanomami. "The Fierce People" was published at the height of the Vietnam War, when violence was the subject of national debate, and it became, in effect, the ethnographic text for the sixties. In 1997, Chagnon told an interviewer for the Los Angeles Times that he had written about the Yanomami in reaction to the "garbage" he had learned in graduate school about "noble savages."

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When Chagnon first encountered the Yanomami, they were thought to be the largest unacculturated aboriginal group on earth. They slept on bark hammocks slung around the periphery of communal roundhouses with open centers, called shabonos. They practiced ritual combats--a graded series of exchanges, starting with chest pounding and escalating into duels with long poles. For gardening, they relied on cutting tools that had been obtained through circuitous trade links with the outside world. Their staple food, which constituted seventy per cent of their diet, was plantains, an import to the New World. Even their genetic makeup was unusual. The Yanomami lack the so-called Diego Factor, an antigen found in other Mongoloid peoples, including Amerindians. Some scientists have hypothesized that they are descended from the first people to cross the Bering Strait, twenty thousand years ago.

The Yanomami had developed a complex belief system about their origins, their afterlife, and their vulnerability to an underworld of demons who were out to destroy souls by spreading disease. (Like many tribal societies, the Yanomami believed that their souls were also threatened by the taking of photographs.) Each village had shamans who maintained constant vigil against the forces of evil by casting spells on perceived enemies.

Today, there are an estimated twenty-seven thousand Yanomami living in hundreds of villages, spread out over about seventy thousand square miles in southern Venezuela and northern Brazil. They speak four distinct dialects, and there are enormous regional variations in trade, warfare, and degrees of contact with the outside world. At the time of Chagnon's first expedition, most of the Yanomami were mountain dwellers. They did not have much in the way of metal tools or personal possessions. They

practiced slash-and-burn agriculture, and they spent much of their time on long treks of hunting and gathering. They did not use canoes--there are no navigable rivers in the mountains--and they had little use for clothes, other than a cotton waistband for women and a penis string for men. Increasingly, however, the Yanomami were leaving the mountains to settle along the main course of the Orinoco. There, during the nineteen-fifties, missionaries had established outposts, and Venezuelan government workers had set up centers for treatment of malaria, which had become endemic along the river. Some of the Yanomami in the lowlands were beginning to wear Western clothes, and they had settled into a relatively sedentary life style, which they supported by growing crops, begging, and performing services for outsiders. It was among these Yanomami that Chagnon established his headquarters, at the confluence of the Orinoco and Mavaca rivers, next door to the Mavaca mission in the village of Bisaasi-teri.

Chagnon arrived in Yanomami territory in an aluminum rowboat with an outboard motor. He was carrying axes and machetes to give to the villagers as payment for their cooperation. Although the people of Bisaasi-teri were accustomed to receiving a trickle of trade goods in return for their work in the mission, the sudden windfall created a sensation. In a letter from the field, Chagnon writes that the first recipients of his gifts, all of whom were male, immediately left the village for remote settlements, where the axes and machetes could be used for trade. One of the most startling conclusions of "The Fierce People" is that Yanomami warfare was caused largely by competition among marriageable men over females, who--thanks to the widespread practice of female infanticide--were in scarce supply. In another letter from the field, Chagnon noted, "This particular war got started the day I arrived in the field (cause: woman stealing), and it is getting hotter and hotter." The Yanomami's need to wage war, he observed, encouraged the breeding of males--and this, in turn, led to more war. Among anthropologists, this conclusion contradicted the conventional wisdom that primitive warfare was the result of competition for hunting territories, cropland, or trade routes. Chagnon later said that his findings had come as a surprise to him, too. In 1988, he told a reporter for U.S. News & World Report, "I went down there looking for shortages of resources. But it turns out they are fighting like hell over women."

Over a period of thirty years, Chagnon led some twenty expeditions into Yanomami territory and collected an unparalleled body of data, which he presented in two books and more than thirty articles. Perhaps Chagnon's most enduring achievement was explaining the Yanomami's seemingly savage behavior in a way that shed new light on natural selection. In 1988, he published an article in *Science* entitled "Life Histories, Blood Revenge, and Warfare in a Tribal Population," in which he reported that the Yanomami men who murdered had twice as many wives and three times as many offspring as non-murderers had. He concluded that, among the Yanomami, the act of killing bestowed status.

This paper had considerable impact beyond the field of anthropology. Edward O. Wilson and other sociobiologists accepted it as important evidence of the genetic origins of human violence. In a preface to Chagnon's 1992 book, "Yanomamö: The Last Days of Eden," which is "The Fierce People" adapted for a general audience, Wilson lauded Chagnon's synthesis of evolutionary biology and culture as a "master work."

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Like most undergraduate anthropology students in the nineteen-seventies, I admired "The Fierce People" for its vivid research and unsentimental approach. In part inspired by Chagnon's example, I set out, in 1983, to do a study of ritual murder in the Andes. Like Chagnon, I concluded that, among some tribes, committing ritual murder was a prestigious act. In 1989, I decided to study the Yanomami, first in Brazil, where the Amazon gold rush had brought epidemics, guns, alcohol, and prostitution, and then in Venezuela, along the Orinoco and in the mountains. Over the next ten years, I made six trips to the Amazon-Orinoco region, spending fifteen months in the field and visiting thirty of the villages that

Chagnon had studied. What I found was sharply at odds with what Chagnon described.

In "The Fierce People," Chagnon wrote that the Yanomami were "one of the best nourished populations thus far described in the anthropological/biomedical literature." Unlike Chagnon's "burly" men, the villagers I encountered were--as Rice had observed in 1924--tiny and scrawny, smaller than most African Pygmies. According to data compiled by Darna L. Dufour, a biological anthropologist at the University of Colorado, the adult males average four feet nine inches in height, and the women four feet seven inches. The children have some of the lowest weight-for-height ratios among Amazonian Indians. Moreover, Chagnon's account of Yanomami warfare seemed greatly exaggerated. I visited a village on the Mucajai River, in Brazil, where Chagnon had spent some time in 1967, and where he claimed to have found a group that demonstrated the most extreme form of Yanomami "treachery." However, according to the authoritative sociologist John Peters, who lived there from 1958 to 1967, the group had participated in only four raids in half a century. These raids, he said, had been provoked not by competition for women, as Chagnon had written, but by the spread of new diseases, which prompted angry accusations of witchcraft.

Others, too, were bewildered by some of Chagnon's writings. The linguist Jacques Lizot, who had been encouraged by Claude Lévi-Strauss at the Collège de France, has lived for twenty-five years with the Yanomami. In 1994, Lizot criticized Chagnon in the *American Ethnologist* for obscuring the identity of twelve villages in his homicide study, making it difficult for other anthropologists to verify his data. The German ethnologist Irenäus Eibl-Eibesfeldt, a former head of the human-ethnology department at the Max Planck Institute, outside Munich, has been conducting research among the Yanomami since 1969. In 1994, he and another Yanomami researcher at the institute wrote a letter to the American Human Behavior and Evolution Society, which claimed that Chagnon had got important mortality-rate statistics wrong.

In the past decade, some of Chagnon's colleagues, as well as Catholic missionaries in the field, have expressed concern about the impact of his research on Yanomami culture. Kenneth Good, who worked with Chagnon while researching his Ph.D., has lived among the Yanomami for twelve years--longer than any other American anthropologist. Good calls Chagnon "a hit-and-run anthropologist who comes into villages with armloads of machetes to purchase cooperation for his research. Unfortunately, he creates conflict and division wherever he goes." During his years among the Yanomami, Good witnessed a single war, and the only time he felt endangered was on his first, nervous night in the field, in 1975, when Chagnon and another anthropologist, both drunk, burst into his hut, tore his mosquito netting, and pushed him out of his hammock in a mock raid.

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In 1995, Brian Ferguson, an anthropologist at Rutgers University, published a book entitled "Yanomami Warfare: A Political History," which challenged the sociobiological theories drawn from "The Fierce People" and other studies by Chagnon. Ferguson, whose book analyzes hundreds of sources, wrote that most of the Yanomami wars on record were caused by outside disturbances, particularly by the introduction of steel goods and new diseases. Ferguson noted that axes and machetes became highly coveted among the Yanomami as agricultural tools and as commodities for trade. In his account, evangelical missionaries, who arrived in Yanomami territory during the fifties, inadvertently plunged the region into war when they disbursed axes and machetes to win converts. In time, some of the missions became centers of stability and sources of much needed medicine. But Chagnon, whose study of Yanomami mortality rates took him from village to village, dispensed steel goods in order to persuade the people to give him the names of their dead relatives--a violation of tribal taboos.

In a chapter entitled "The Yanomamo and the Anthropologist," Ferguson described how these methods

destabilized the region--in effect, promoted the sort of warfare that Chagnon attributed to the Yanomami's ferocity. By Chagnon's own account, he shuttled between enemy villages and cultivated "informants who might be considered 'aberrant' or 'abnormal' outcasts in their own society," and who would give him tribal secrets in exchange for beads, cloth, fishhooks, and, above all, steel goods. To get the data he wanted, Chagnon, by his own account, began "'bribing' children when their elders were not around, or capitalizing on animosities between individuals." Ferguson writes that Chagnon stirred up village rivalries by behaving like a regional big man and an "un-Yanomami...wild card on the political scene."

This depiction of Chagnon was supported by many of the Yanomami with whom I spoke. In 1996, in the village of Momaribowei-teri, a man named Pablo Mejía told me that when he was twelve he had witnessed Chagnon's arrival in his village: "He had his bird feathers adorning his arms. He had red-dye paint all over his body. He wore a loincloth like the Yanomami. He sang with the chant of his shamanism and took yopo"--a powerful hallucinogen used by Yanomami shamans to make contact with spirits. "He took a lot of yopo. I was terrified of him. He always fired off his pistol when he entered the village, to prove that he was fiercer than the Yanomami. Everybody was afraid of him because nobody had seen a nabah"--white man--"acting as a shaman. He said to my brother Samuel, who was the headman, 'What is your mother's name?' My brother answered, 'We Yanomami do not speak our names.' Shaki"--the Yanomami's name for Chagnon--"said, 'It doesn't matter. If you tell me, I'll pay you.' So, although they didn't want to, the people sold their names. Everyone cried, but they spoke them. It was very sad."

Ferguson described an incident, in 1972, when Chagnon arrived in the village of Mishimishimabowei-teri, approximately seventy miles upriver from Bisaasi-teri. In exchange for blood samples, which he was collecting for his genealogical study, Chagnon distributed machetes to a nearby rival village, whereupon the headman of Mishimishimabowei-teri, an aggressive man named Moawa, threatened, Chagnon wrote, to "bury an ax" in his head if he didn't give his last machete to a man Moawa designated. Chagnon complied, but when he was safely back at his home base, in Bisaasi-teri, he vented his feelings in a way that shows how deeply he had become enmeshed in local politics. In "Studying the Yanomamö," Chagnon writes, "I told the Bisaasi-teri that I planned never to return to Moawa's village....I was tired of having people threaten to kill me. I was alarmed at how close some of them had come. I told them that I would do 'the same' to Moawa as he did to me, should he ever venture to come to Mavaca [mission] to visit."

In a review of Ferguson's book in *American Anthropologist*, Chagnon blamed the missionaries for any destabilization, pointing out that the conflicts had broken out long before 1964, when he arrived. In the 1997 edition of "The Fierce People," he wrote that he had been something of a savior to the people of Mishimishimabowei-teri, helping to broker "neolithic peace" between them and the antagonistic people of Bisaasi-teri. He said that, in return, the Mishimishimabowei-teri had bestowed on him the name of their village--an honor usually reserved for chiefs. "I was their village," Chagnon writes. "Their village was me."

Chagnon, who retired this year as a professor of anthropology at the University of California in Santa Barbara, still retains his eminence in the field. Irvén DeVore, a professor of biological anthropology at Harvard, says, "Chag was both first and thorough. First in the sense that very, very few anthropological studies have been carried out by an anthropologist who was first on the scene. Thorough in the sense that Chag has visited at least seventy-five Yanomami villages on both sides of the Venezuela and Brazil borders. I cannot think of a comparably thorough survey among any cultural group by any anthropologist. Chag gathered very detailed and documented data on the villages--so much so that another investigator could study the same population and come to a different conclusion. Chagnon's study was 'scientific' in the best sense of the word."

In 1995, Chagnon agreed to meet with me in his office in Santa Barbara. By this time, I had become a human-rights activist on behalf of the Yanomami and other Amazon tribes. I had written a piece in the New York Times that was critical of one of Chagnon's Venezuelan friends and colleagues, Charles Brewer-Carías, and Chagnon was angry about it. In recent years, he had become such a controversial figure for his research among the Yanomami that the Venezuelan government had prohibited him from reëntering Yanomami country. Chagnon refused to answer any of my substantive questions about his troubles, saying that, at some later date, he planned to write about them himself. During the preparation of this article, he was again asked to answer questions about his work with the Yanomami. After first agreeing to talk in depth to The New Yorker, he changed his mind a few days later and declined to comment.

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One of Chagnon's most important academic mentors was the celebrated geneticist Dr. James Neel, who was a member of Chagnon's Ph.D. advisory committee at the University of Michigan. Neel, who died earlier this year, first achieved fame in the field of inherited disease and then headed the Atomic Bomb Casualty Commission, which was established after the war to study survivors of the bombings of Hiroshima and Nagasaki. Between 1965 and 1972, he received more than two million dollars from the Atomic Energy Commission to compare the cellular-mutation rates of the Japanese survivors with those of the Yanomami and other "primitive tribes" that had not been exposed to radiation. The immediate goal was to determine the effects of radiation on the genetic material of cells. The ultimate goal was to help set radiation safety standards in the United States.

Chagnon became, as Neel put it, the "indispensable cultural anthropologist" in Michigan's Human Genetics Department. Between 1966 and 1971, Chagnon made six trips to Brazil and Venezuela, as a member of a multi-disciplinary team led by Neel to make what Neel described as the most comprehensive study of a tribal people ever attempted.

Neel had long been interested in unadulterated societies. A self-professed eugenicist, he believed that modern democracies, with their free breeding among large populations, violated the process of natural selection and promoted genetic entropy. Tribal people, in his view, were likely to have superior genetic material because they lived according to the survival-of-the-fittest principle--that is, they were ruled by polygamous chiefs who had triumphed over their rivals. He hoped that by studying the Yanomami he might be able to isolate specific genes for male leadership--or, as he put it, an "Index of Innate Ability." This view of the Yanomami as a superior breeding stock was not generally shared by Neel's medical colleagues. Most of them believed that the Yanomami, like other Amerindian tribes, were immune-depressed.

In January, 1968, Neel's team, which included Chagnon, Asch, and a Venezuelan doctor, Marcel Roche, arrived on the upper Orinoco. Chagnon was sent ahead of the others to secure, as he later wrote, "agreements from the Yanomamo to provide endless outstretched brown arms into which many needles would be stuck for the next weeks." Asch described the process in notes for one of his films: "The villagers are studied on a production line: numbers are assigned to them; specimens of their blood, saliva, and stools are collected; impressions of their teeth are made; and they are weighed and measured by the physical anthropologists." Each person was also photographed and paid with what Neel called "a 'cash' transaction based on trade goods."

Neel had learned of an outbreak of measles that had occurred the previous fall among Brazilian Yanomami in villages more than a hundred miles from the Venezuelan missions. For what he later called "an exercise in preventive medicine," Neel's team brought a thousand doses of live measles vaccine into the upper-Orinoco region. Neel was eager to collect data on vaccine responses. At the time,

geneticists wanted to study tribal people who had no measles antibodies, in order to determine how their immune responses differed from those in modern societies. In 1966, Francis Black, a geneticist at Yale, had vaccinated a Brazilian tribe, the Tiriyo, with a measles vaccine, in the hope of using the vaccine virus as "a model of natural measles." He found that the Tiriyo's post-vaccination fevers were extraordinarily high; the temperature elevations were nearly three times those of other races that had been given the same vaccine.

Black had chosen the widely used Schwarz measles vaccine, rather than an older vaccine, the Edmonston B, citing "the risk of severe febrile response" with the Edmonston B vaccine. In 1962, when an immune-compromised child with leukemia died after receiving Edmonston B, one of the vaccine's inventors, John Enders, of Harvard, had cautioned that the strain was dangerous for immune-depressed people. Measles vaccines were also known to produce unusually severe reactions in people suffering from anemia, dysentery, or chronic exposure to malaria-and the Yanomami suffered from all three.

Two years after Black conducted his study, Neel took the Edmonston B vaccine, rather than the Schwarz, into Yanomami territory. None of the other members of Neel's team seem to have participated in this decision, and there is no evidence that any of them would have known the difference between the two vaccines. In January, 1968, Venezuela had begun a national vaccination project, administering the Schwarz vaccine in three diluted doses, on the recommendation of the Centers for Disease Control, in Atlanta. In the United States, where many children still received the Edmonston vaccine-it is no longer used anywhere in the world-it was given with an accompanying dose of gamma globulin, which reduces the fevers by half. Neel had his researchers administer Edmonston B without gamma globulin to forty tribespeople at a mission on the Ocamo River. According to the director of Venezuela's vaccination department, Dr. Adelfa Betancourt, they did so without the department's permission. (A science historian at the University of Pennsylvania, Susan Lindee, was recently quoted in Time to the effect that Venezuelan officials gave permission for the vaccinations. She has since told The New Yorker that her evidence for the claim was erroneous.)

Over the next three months, the worst epidemic in the Yanomami's history broke out. On the basis of three mission journals, data of the expedition itself, and interviews with Yanomami survivors and with other witnesses, I determined that the course of the epidemic closely tracked the movements of Neel's team. It broke out in the three settlements that received the vaccinations-the Ocamo mission, the Mavaca mission, and a village called Patanowa-teri. Because quarantines were not rigorously imposed, the disease spread to dozens of villages scattered across thousands of square miles. It is estimated that between fifteen and twenty per cent of the Yanomami who contracted measles died in the epidemic.

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A child's unmarked grave lies next to a dirt airstrip at the Catholic Ocamo mission. Thirty years ago, a small cross was erected at this spot, but it could not withstand the tropical weather. The remains in the grave are those of a year-old boy named Roberto Baltasar, who died on February 15, 1968; he was the first clearly diagnosed case of measles among the Venezuelan Yanomami recorded in the mission journals. According to Vitalino Baltasar, the boy's father, Roberto had come down with the disease after being vaccinated by Chagnon, under the direction of Neel.

In a 1970 paper entitled "Notes on the Effect of Measles and Measles Vaccine in a Virgin-Soil Population of South American Indians," Neel and Chagnon tell a different story. In their account, a single case of measles coincidentally broke out among the Venezuelan Yanomami as soon as Chagnon and Asch arrived at the Ocamo mission. The measles, Neel and Chagnon wrote, had been brought by a fourteen-year-old Brazilian worker, who had come to Ocamo with other workers. They said that Roche had made "a tentative diagnosis of measles" in the Brazilian teen-ager, and added that Roche's diagnosis

was "uncertain," because the boy's symptoms could not be distinguished from "any of a variety of 'jungle fevers.'" (And the boy showed no signs of a measles rash.) Twenty-eight years later, I talked to Roche in Venezuela, in the offices of a scientific journal of which he was the editor. He told me that he did not remember having diagnosed measles in the Brazilian boy. Indeed, according to the Mavaca-mission records, Roche and another doctor reported that the team's arrival had coincided with an ongoing epidemic of bronchopneumonia, whose symptoms match those that Neel and Chagnon described in the fourteen-year-old boy.

Chagnon and Roche began vaccinating the Ocamo Indians with Edmonston B for purely "preventive" reasons, Roche later told me. According to Neel and Chagnon, cases of "moderately severe measles" appeared among the vaccinated Yanomami six days after they were inoculated. The fevers Neel and Chagnon recorded were, on average, far higher than previous responses to the Edmonston B vaccine--so high that they could not be distinguished from the fevers of natural measles. Then Roberto Baltasar died. According to his father, vaccinated Yanomami began fleeing the Ocamo mission, and going into the hills. "They already carried the disease," he told me, twenty-eight years later. "Few of them returned, because the majority died."

It cannot be determined with any accuracy how many died after receiving the vaccination. Chagnon has said that no one who was vaccinated got measles, and, according to the medical consensus at the time, the Edmonston B vaccine virus was not, in itself, contagious. Today, scientists still do not know whether people who have been vaccinated with Edmonston B can transmit measles. What is certain is that the effects of an epidemic, in which hundreds died in a relatively short period, were especially devastating on a people who believed that some new black magic must have brought on the disease and who, at the first sign of the measles rash, panicked and fled from their homes into the forests, away from further medical attention.

A government nurse who was in the area at the time, Juan González, helped the Yanomami collect the bodies of the dead for cremation. "They hung the children in baskets from the trees," he recalls. "The cadavers were placed inside the baskets, all rolled up tightly, like a metallic foil. The women were more loosely wrapped, in leaves, and they were left hanging in hammocks out in the wild among the trees. They tied the men up on poles, higher up in the branches. What a stench there was. Nothing but dead Yanomami. The Yanomami say that they died from that vaccine. That's why even now some of them don't want to be vaccinated. I don't know how to explain it either, because we initially believed that that first vaccine had come to help us. Instead, it came to destroy us."

Asch, who died in 1994, left about twenty thousand feet of raw footage of the expedition, along with sound tapes, to the Smithsonian Institution. The first mention of the measles outbreak on the soundtrack is heard on the eighteenth of February, three days after Roberto Baltasar's death. On that day, Asch recorded Neel giving him instructions on filming measles victims at the team's base camp, at Mavaca, where a second vaccination center had been established. "Let me tell you what we want to get--extreme severe morbilliform rash," Neel says. "Can you get this?... Both eyes. He has the typical morbilliform rash on both cheeks.... I'm afraid you're going to [see] some severe cases of measles.... We're going to be able to document the whole gamut of measles in this group."

Later, Chagnon asks Neel to summon more doctors, from Caracas, to treat the measles, and Neel agrees. Their radio operator, whom they call Rousseau, says that he will contact people in Caracas and request antibiotics "por los efectos de la vacuna"--because of the effects of the vaccine--and adds that the vaccine may bring "brotos de sarampión," outbreaks of measles. After listening to Rousseau, Chagnon cautions Neel, "But he's trying to interpret all of them to mean that it's a reaction to the vaccination, which I don't think is a wise thing to do." Chagnon seems bewildered by the extent of the outbreak. He says, "Now we have measles at Mavaca and Ocamo, and I don't know where else it is--I don't know

when it arrived."

Later, he tells Neel that the Ocamo Yanomami could easily spread the disease to others by journeying to nearby villages to trade. (Apparently, this happened. A group of Ocamo Yanomami who had sold blood to Neel's researchers for knives, machetes, and other trade goods travelled upriver to visit a village called Shubariwa-teri, which was then devastated by measles.) Chagnon suggests that Neel take quarantine precautions at Mavaca, and he urges that doctors be flown in from Caracas to care for the Ocamo Yanomami. Neel agrees. He then orders his younger colleagues to move farther up the Orinoco, into the tribe's heartland.

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During the epidemic, Neel, Chagnon, and Asch made two award-winning films. One was "Yanomamö: A Multidisciplinary Study," which presents a general overview of Neel's research objectives. The other was "The Feast," which documents the celebration of a military alliance between two formerly hostile villages. "The Feast" is widely considered one of the finest ethnographic films ever made, because of how it depicts the Machiavellian underpinnings of tribal festivities. In Asch's notes, he explained the background to the film: "To conduct raids and to protect itself from attack, a Yanomamö village must ally itself with neighboring villages. The feast is a means by which these intervillage alliances are formed. To prepare for a feast, the village is first cleaned. Gallons of banana soup for the guests are cooked and stored in large troughs. The guests, waiting outside the village, send in an emissary who chants a greeting and brings back food to his people. The guests burst in, dancing and brandishing their weapons, while the hosts recline in their hammocks. Feasting, trading, and games of ritual violence then take place. Sometimes these 'games' escalate into real massacres."

Both "A Multidisciplinary Study" and "The Feast" were filmed in the village of Patanowa-teri. Twenty-eight years later, when I visited there, a tribal elder named Kayopewe told me, through a translator, that before Chagnon and Asch arrived with their equipment the village had fallen into ruins and was largely abandoned. It was reconstructed and reoccupied, he said, only after Chagnon promised that if the villagers moved back in and held a peacemaking feast with their neighbors from a hostile village called Mahekoto-teri he would give every man among them a machete. Kayopewe said that the whole affair had, in effect, been brokered by the filmmakers.

Asch partly confirmed this account in an article published in the film journal *Sightlines*, in 1972. In a description of the making of "The Feast," he said that Chagnon had sent him, three Yanomami, and a young Protestant missionary, Daniel Shaylor, on an eleven-day trek to Patanowa-teri, a "mountain hideout" far from the vaccination centers along the Orinoco. "After finding [the] Patanowa-teri we set up an aircraft radio and reached Napoleon at Mavaca. He convinced the headman to move back into an old garden near the Orinoco River where the genetics expedition could work with them and we could take film." A large shipment of metal pots duly arrived as payment for the villagers' cooperation. In 1995, according to an article in the *Visual Anthropology Review*, Chagnon said, "I did not 'stage' this--it happened naturally. They could not have cared less about our interests in filming and are the kind of people who would not do something this costly and time consuming for two whole communities simply to accommodate the filming interests of outsiders."

Other payments were required--so many that Chagnon radioed for another plane to bring in more trade goods. When Chagnon distributed the goods, he created what seems, on the soundtrack, to be pandemonium. Later, when Chagnon and Asch asked a group of Yanomami to cut some bananas in front of the camera, they suddenly burst into a frenzied dance--"screaming at the top of their lungs, waving branches of leaves in the air," as Asch later wrote in *Sightlines*. Asch filmed the scene, assuming that it was a "garden ritual." When the Yanomami finally stopped, Chagnon asked them, "What was that

all about?"

"Isn't that what you just asked us to do?" the headman replied.

The filming of "The Feast" also had unforeseen consequences. When Chagnon invited the Patanowa-teri's former enemies, the Mahekoto-teri, to participate as guests, he created a new alliance. According to Chagnon, it is Yanomami custom for two villages to celebrate such a union by choosing a new enemy, and after feasting together the new allies launched a raid on a third village, killing a woman in the process. One day, when Asch tried to film a doctor who was treating a sick man from the village of Mavaca, Neel interrupted him. "I don't want any of this," he said. "You're here to document the kind of study we're trying to make. Anyone can walk into a village and treat people. This is not what we're here to do."

After Neel's researchers departed, many of the Mahekoto-teri and Patanowa-teri became sick and died. It is not clear what they died of, because they may have been exposed to many different pathogens, including colds, the Edmonston B virus, and malaria. (Shaylor, the expedition's translator, had arrived in Patanowa-teri with malaria, where he became so sick that he had to be evacuated.) In 1996, when I showed the elders of both villages a video of "The Feast," many of the old men wept. Kayopewe said, "We broke out in sores and rash on our faces, and it burned really badly. One of us died at the village [where the filming took place]. We left him there and fled into the jungles. An old man would die. We would tie him up in the trees. And then a young woman would die, and we would leave her in a basket. We kept dying off and dying off." When the men heard a translation of the soundtrack of "A Multidisciplinary Study," in which Neel claimed that the Patanowa-teri had been saved from measles, thanks to the vaccinations, there was a chorus of protest. "Horemu! Horemu!" ("Lies, lies.") One man told me, "Shaki stole our spirits, and we have never been the same."

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By the mid-seventies, the Yanomami had become the most intensively studied and filmed tribal group in the world. In Paris in 1978, a festival was devoted to films about them. As scientists, news teams, filmmakers, and others competed for footage and new data about the tribe, some of the Yanomami along the Orinoco became part-time film extras and anthropological informants.

At the same time, native-rights advocates began to criticize outsiders--gold miners, journalists, missionaries, scientists--claiming that cultural disruption and epidemics invariably followed their visits into tribal territories. The first group to defend Yanomami rights was formed in Brazil, and a split developed in anthropology between the researchers who wanted simply to observe tribal culture and those who wanted Indians to have land rights and health care. From 1976 until 1985, Chagnon was prohibited from reëntering Yanomami territory. During those years, he and his wife, Carlene, raised two children, and he became a popular lecturer at Northwestern and then at the University of California at Santa Barbara.

In 1985, Chagnon, accompanied by a University of California graduate student, Jesús Cardozo, who was Venezuelan, succeeded in reëntering Yanomami territory. He returned to Mishimishimabowei-teri, where he hoped to finish his long-term study of the relationship between Yanomami homicide and reproductive success. Cardozo, who no longer has cordial relations with Chagnon, went on to help create the Venezuelan Foundation for Anthropological Research, which promotes Yanomami education and land rights. As Cardozo later recalled of the expedition, "We hadn't even got our boat moored to the shore at Mavakita"--a Mishimishimabowei-teri village that had broken off from the main group following various epidemics in the early seventies--"when Yanomami started coming out and shouting,

'Go away! Shaki brings xawara [illness].' Within our first twenty-four hours there, three children died--two in the night and another in the morning." Although there was no connection between Chagnon's arrival and the deaths, the events were seen as further evidence of the anthropologist's malefic power. "On our second night, half of the village fled into the forest to get away from us."

After another day of searching for a community where he could continue his genealogical research, Chagnon found a village, Iwahikoroba-teri, that was willing to receive the expedition. "When we arrived at Iwahikoroba-teri, everybody was sick, throwing up and moaning and lying down in their hammocks," Cardozo said. "I remember a little girl, Makiritama. She was vomiting blood. She was defecating blood, too. I remember her husband--she was very young, she was to be his future wife--showed me where she was spitting up and everything. And I went up to Chagnon and said, 'You know these people are really sick. Some of them could die. I think we should go and get medical help.' Chagnon told me that I would never be a scientist. He said, 'No. No. That's not our problem. We didn't come to save the Indians. We came to study them.'"

For the next several weeks, Chagnon collected homicide data, numbering each Yanomami's chest or arm with a Magic Marker, posing the Yanomami for identification photographs, and paying them with trade goods. He summarized his findings in an article in *Science*, which was published in February, 1988. The article was noted in *Scientific American* for providing a new, though grim model for human evolution: "Through violence a Yanomamö male seems to enhance his reproductive success and that of his kin: he becomes 'fitter.' "

But Yanomami specialists generally rejected the study. In a number of anthropological journals, they challenged Chagnon's findings on ethical, statistical, linguistic, and interpretive grounds. And Chagnon's presence in the media--he was mentioned in the *Los Angeles Times*, in February, 1988, as having said that when the Yanomami were not hunting, or searching for honey, they were often killing one another--became provocative. Less than a year after the *Times* article appeared, the Brazilian military chief of staff cited the Yanomami's truculence as a reason for breaking up their lands. A past president of the Brazilian Anthropological Association, Maria Manuela Carneiro da Cunha, wrote a letter to the *Anthropology Newsletter* in which she held Chagnon accountable, in part, for the government's actions against the Yanomami. In an article entitled "The Academic Extermination of the Yanomami," which was published in the Brazilian cultural journal *Humanidades*, two anthropologists, Alcida Ramos and Bruce Albert, wrote, "Few indigenous people... have had their image as denigrated as have the Yanomami, who had the misfortune of being studied by a North American anthropologist named Napoleon Chagnon."

Chagnon responded to da Cunha in the *Anthropology Newsletter* by saying that he could not control the press's tendency to sensationalize his findings, and that he should not be held responsible for the failure of Brazilians to defend the rights of indigenous people. In his 1992 revised edition of "Yanomamö," for which he dropped the subtitle "The Fierce People," he drew a distinction between researchers who sought objective facts, like him, and other anthropologists, who were motivated by a sense of political activism and who "hold a romantic, Rousseauian view of primitive culture."

In 1989, Chagnon proposed bringing a BBC film crew to Bisaasi-teri to commemorate the twenty-fifth anniversary of his arrival in the village. By this time, many more Yanomami had left the highlands to live near the missions along the Orinoco and its tributaries, where they could attend schools, get medical care, and eat a more varied diet. The Yanomami at the missions were considerably more robust than those in the hills, and they had learned how to market their own handicrafts through a trade cooperative run by elected representatives. Along the Orinoco and Mavaca rivers, it was no longer easy for researchers to hire Yanomami porters, informants, or film extras. When the Yanomami at Bisaasi-teri learned that Chagnon was returning, they instructed their representative, a former guide of Chagnon's

named César Dimanawa, to write a letter asking the anthropologist to keep away, because his films contained so much "fighting and bloodshed." Dimanawa wrote, "We do not want you to make any more films." Again, the Venezuelan government cancelled Chagnon's permit, citing the "turmoil" that his visit would provoke.

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Chagnon turned for help to Brewer-Carías, his old friend. A distinguished botanist, Brewer-Carías had been criticized by environmentalists and human-rights activists for allegedly acquiring, under the pretense of doing research in rain forests, land for gold mining-charges that he emphatically denies. Through Brewer-Carías, Chagnon made another powerful ally, Cecilia Matos, the mistress of the Venezuelan President, Carlos Andrés Pérez, and the head of a foundation that had been set up to assist indigenous and peasant families. Chagnon, Brewer-Carías, and Matos devised a plan to create a Yanomami reserve in the Siapa Highlands-an area of thousands of square miles in which the Indians would live in protected isolation. Only scientists would be allowed into the area, to study the Yanomami at a research center run by Chagnon and Brewer-Carías.

Between August, 1990, and September, 1991, Chagnon and Brewer-Carías organized a dozen expeditions by helicopter into the Siapa region for journalists and scientists, in order to build up national and international support for their project. Three of the villages that were visited by Chagnon, Brewer-Carías, and their entourage were badly damaged by the helicopters. In 1991, Chagnon described one of these events in an article for the magazine *Santa Barbara*, entitled "To Save the Fierce People": "A few feet from landing, we aborted when we saw the leaves of their roofs being blown away by the chopper's downblast. We saw people fleeing in terror and men throwing sticks and stones at us as we retreated up and away."

Dr. Carlos Botto, the director of the Amazon Center for the Investigation and Control of Tropical Disease, in Puerto Ayacucho, was in the village of Ashidowa-teri when Chagnon landed in his helicopter and part of the shabono collapsed. "When the poles of the roof fell, a number of Yanomami were injured, and we had to treat them," Botto recalls. "We had to rescue people who were buried under the poles and roofing of the shabono. It was a serious situation. The shamans and elders began to practice their chanting because of the collapse of the shabono. The expedition left a tragic scar."

In September, 1993, Chagnon and Brewer-Carías were named to a Presidential commission, which was given broad powers over the Yanomami's land and political future. The attorney general's office, leaders of the Catholic Church, and native-rights groups opposed the appointments, and three hundred representatives from nineteen Indian tribes rallied in the streets of Puerto Ayacucho, the capital of the state of Amazonas, in an effort to have Chagnon and Brewer-Carías expelled from Yanomami territory. On September 30th, Chagnon was escorted to Caracas by an Army colonel, who confiscated his field notes and advised him to leave the country--which he did.

In the United States, Chagnon remained highly regarded. Earlier that year, he had been elected president of the prestigious Human Behavior and Evolution Society.

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In September of 1996, after undergoing a weeklong quarantine, I trekked for seventeen days into the Siapa Highlands with a Brazilian malaria-control worker, Marinho De Souza. We were the first outsiders to revisit the area since Chagnon's tumultuous helicopter descents, and we found the villages very different from his descriptions. In articles and in interviews, Chagnon had said that the Siapa

Yanomami were healthy, well fed, and peaceful. Here, in the tribe's unspoiled heartland, steel goods were scarce, and the homicide rate among men was much lower than it was in the lowlands along the Orinoco.

What De Souza and I discovered, however, was a fearful, broken society. At Narimobowei-teri, the first village that Chagnon's helicopter had damaged, men with drawn arrows greeted us, fearing that we were enemy raiders. At night, we listened to the chanting of shamans who were trying to exorcise the demonic flying machine that had descended upon their village, dispensing both wonderful trade goods and, they believed, terrible disease. At another village, Toobatotoi-teri, which Chagnon described as "the last uncontacted group in this region," we came to a clearing where shamans were trying to induce helicopters to land by chanting and dancing. The plan, apparently, was to trick any outsiders into unloading their steel gifts and then to scare them into leaving--quickly, before they could infect the people with colds and fevers. Life in the Siapa Highlands had always been a struggle. The villagers had combatted malnutrition, intestinal parasites, and, more recently, malaria. But what they could not comprehend--and what had shaken their world--was the sudden arrival of visitors who seemed to offer an easier life and, at the same time, sowed so much confusion. For them, Chagnon had come to personify everything that both attracted and repulsed them about our culture. They wanted him, and they didn't want him, and they could not forget him.

After twelve days of trekking, we reached Ashidowa-teri, the village where a number of Yanomami had been injured when Chagnon's helicopter blew away a roof. They were living in what looked like woefully inadequate lean-tos, and they were the most sickly, dispirited Yanomami I had seen in Venezuela. As soon as we entered their clearing, a man grabbed my hand, held it to his feverish forehead, and cried, "Hariri!" ("Sickness.") Many of the people had painted their faces black, in mourning, and most of the children looked malnourished.

At night, in the firelight of circled hearths, the Yanomami sang about the mysterious arrival of the helicopters and their strange riders. Then the people around the campfires began mourning for their departed kin. The headman, Mirapewe, said to me, "If you could count the dead, you would see how many of us there were."